PUBLIC DOCUMENT . . . . . No. 55.

# ANNUAL REPORT

OF THE

# INSPECTOR

OF

# Gas Meters and Illuminating Gas.

JANUARY, 1901.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
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# Commonwealth of Massachusetts.

## REPORT.

OFFICE OF GAS INSPECTION, 32 HAWLEY STREET,
BOSTON, MASS., Jan. 15, 1901.

*To the Honorable Senate and the House of Representatives.*

The Inspector of Gas Meters and of Illuminating Gas submits the following annual report: —

During the year ending Dec. 31, 1900, there have been 725 gas inspections made, 30,565 gas meters tested, a number of eudiometric gas analyses made, and the usual amount of office work attended to. No meter provers have been presented for calibration.

On July 16 chapter 459 of the Acts of 1900 became operative. This act provides for a first and second assistant inspector of gas meters and of illuminating gas; provides for turning over, in gross, to the Treasurer of the Commonwealth, the fees collected for meter inspections, and for paying all bills through the Auditor's office; provides for applying the fees so collected, and turned over, to the salary, travelling and other expense accounts of the inspectors and deputies; and provides an additional sum for office rent, apparatus and general office expenses. Under this act Mr. Lawrence S. James of Boston was appointed first assistant inspector and Mr. Charles H. Stone of Newton second assistant inspector.

### GAS.

Owing to the increased amount of gas supplied by the 69 companies in the State, the number of inspections has increased from 687 in 1899 to 725 in 1900. The gas of every company was tested at least twice during the year,

and an additional inspection was made for every six million cubic feet of gas supplied by each company, excepting that the gas of no company was inspected oftener than once a week. The inspections were made at irregular intervals, and no notice whatever given of an intended inspection. One-quarter or more of the tests of each company were made by the inspector personally. The usual tests comprised a determination of the candle-power, the amount of total sulphur and ammonia and the presence or absence of sulphuretted hydrogen; except that in the tests of gas made from petroleum the tests for total sulphur and ammonia were omitted, on account of the exceedingly small amounts of these impurities shown by previous analyses. Samples were frequently taken and eudiometric analyses made of doubtful or unusual gases.

The law provides that: "Every gas light company annually manufacturing more than fifteen million cubic feet of gas shall provide a suitable room, at least a quarter of a mile from the gas works, containing a disc photometer of a construction approved by the inspector; and such room shall be open to the inspector and his assistants on every working day from eight o'clock in the morning till six o'clock in the afternoon." Twenty-nine companies have such stationary photometers set up in their offices or in rooms open to the inspectors; for the remaining forty companies a portable photometer was carried. The burner best adapted to the gas, which was at the same time suitable for domestic use, was used in the photometers, and the gas burned through it at as near the rate of five feet per hour as was practicable. Sugg's London argand burners, the D, E and F sizes, old pattern, the F, new pattern, as well as the certified standard burners for English official testing, were used for coal gas and mixed coal and water gas, candle-power determinations. For water gas the Sugg's table-top open burner, six-foot size, was found to give the best results. For petroleum gas the small one-foot iron tip with a fairly wide slit was generally used. All candle-power results were reduced to a rate of five feet per hour.

For the determination of total sulphur the gas was burned at the rate of from five-tenths to six-tenths of a foot per

hour, in an ammoniacal atmosphere; the products of combustion were collected and analyzed for sulphur.

The ammonia was determined by bubbling the gas through an acid of known strength, colored with cochineal; the acid was of such strength that ten cubic centimetres was equivalent to one one-hundredth of a grain of ammonia. This test was carried on until one foot of gas had been bubbled through at the sulphur testing rate; if the cochineal had not then taken on the ammoniacal color, indicating saturation of the acid, or one grain of ammonia per one hundred feet of gas, the result was recorded as 1.—. This result does not necessarily mean that any ammonia is present in the gas, but simply that the test has been carried to this point and then stopped.

Sulphuretted hydrogen was determined, qualitatively, by exposing a paper, moistened with a solution of basic acetate of lead, to the stream of gas from an open fixture, without the burner, for thirty seconds; any brown discoloration indicated sulphuretted hydrogen.

The average results of these gas inspections are given in the following tables.

At the request of the Board of Gas and Electric Light Commissioners, the results of gas inspections are furnished the Board from time to time during the year. The legal standard requires illuminating gas to give a light equal to sixteen standard English sperm candles, to contain not more than twenty grains of total sulphur or ten grains of ammonia per one hundred cubic feet of gas, and to contain no sulphuretted hydrogen. The failure to meet any one of these requirements, three times consecutively, incurs a penalty of one hundred dollars, to be paid to the city or town supplied by the gas company.

*Larger Companies.*

| Number of Inspections made. | NAME OF PLACE OR COMPANY. | CANDLE-POWER. | | | GRAINS PER ONE HUNDRED FEET OF GAS OF— | |
|---|---|---|---|---|---|---|
| | | Average. | Highest. | Lowest. | Sulphur. | Ammonia. |
| 52 | Boston, . . | 22.57 | 26.9 | 19.2 | 8.66 | 1.— |
| 8 | Brockton, . . | 17.41 | 19.2 | 16.2 | 14.27 | 1.— |
| 52 | Brookline, . . | 20.08 | 23.4 | 17.5 | 8.57 | 1.— |
| 41 | Cambridge, . . | 17.70 | 19.0 | 16.0 | 14.46 | 1.— |
| 22 | Charlestown, . | 18.40 | 20.0 | 15.6 | 14.53 | 1.— |
| 7 | Chelsea, . . | 18.23 | 19.2 | 17.2 | 11.26 | 1.29 |
| 38 | Dorchester, . . | 22.26 | 26.7 | 17.2 | 9.24 | 1.— |
| 10 | East Boston, . | 18.11 | 18.9 | 17.6 | 10.93 | 2.92 |
| 24 | Fall River, . . | 20.88 | 24.2 | 15.1 | 8.33 | 1.— |
| 5 | Fitchburg, . . | 18.36 | 19.3 | 17.5 | 12.02 | 1.— |
| 6 | Gloucester, . . | 18.22 | 19.3 | 17.4 | 14.57 | 1.— |
| 17 | Haverhill, . . | 23.77 | 27.2 | 21.5 | 6.99 | 1.— |
| 12 | Holyoke, . . | 18.36 | 20.0 | 17.0 | 11.67 | 7.52 |
| 15 | Jamaica Plain, . | 18.57 | 19.9 | 17.5 | 12.33 | 1.03 |
| 20 | Lawrence, . . | 19.83 | 21.1 | 19.2 | 9.70 | 1.— |
| 52 | Lowell, . . | 20.46 | 23.0 | 18.2 | 9.40 | 1.— |
| 28 | Lynn, . . . | 19.88 | 22.3 | 17.3 | 13.40 | 1.— |
| 13 | Malden, . . | 17.77 | 19.7 | 14.7 | 11.77 | 1.— |
| 14 | New Bedford, . | 19.66 | 22.4 | 18.3 | 10.94 | 1.— |
| 17 | Newton, . . | 18.49 | 19.5 | 18.0 | 14.44 | 1.— |
| 8 | North Adams, . | 18.25 | 21.7 | 17.4 | 7.51 | 4.27 |
| 5 | Northampton, . | 18.64 | 20.3 | 17.4 | 11.75 | 1.— |
| 5 | Pittsfield, . . | 23.16 | 24.1 | 22.5 | 6.80 | 1.— |
| 39 | Roxbury, . . | 25.57 | 26.8 | 23.3 | 8.66 | 1.— |
| 10 | Salem, . . . | 17.57 | 19.2 | 16.2 | 15.92 | 1.44 |
| 21 | South Boston, . | 25.50 | 27.2 | 24.1 | 9.43 | 1.— |
| 26 | Springfield, . | 19.71 | 21.8 | 18.4 | 11.42 | 1.— |
| 9 | Taunton, . . | 18.54 | 19.5 | 17.7 | 10.61 | 3.37 |
| 6 | Waltham, . . | 18.13 | 19.1 | 17.3 | 9.15 | 4.33 |
| 40 | Worcester, . . | 20.40 | 22.5 | 17.9 | 12.33 | 1.— |
| | Average, . | 19.82 | – | – | 11.04 | 1.46 |

*Smaller Companies.*

| Number of inspections made. | NAME OF PLACE OR COMPANY. | Candle-power. | GRAINS PER ONE HUNDRED FEET OF GAS OF— | |
|---|---|---|---|---|
| | | | Sulphur. | Ammonia. |
| 3 | Adams, | 22.40 | 10.20 | 1.— |
| 3 | Amesbury, | 22.20 | 10.50 | 1.— |
| 3 | Arlington, | 18.60 | 9.30 | 1.— |
| 3 | Athol, | 21.83 | 5.93 | 1.— |
| 4 | Attleborough, | 18.27 | 15.22 | 1.— |
| 3 | Beverly, | 19.03 | 12.33 | 2.87 |
| 3 | Chicopee, | 20.90 | 11.07 | 2.30 |
| 3 | Clinton, | 17.23 | 14.77 | 1.— |
| 2 | Danvers, | 15.60 | 9.70 | 1.70 |
| 3 | Dedham, | 17.13 | 12.60 | 2.73 |
| 2 | Easthampton, | 19.70 | 14.20 | 1.— |
| 3 | Framingham, | 19.00 | 11.07 | 1.— |
| 3 | Greenfield, | 18.53 | 9.93 | 16.47 |
| 2 | Ipswich, | 25.45 | 6.65 | 1.— |
| 2 | Marblehead, | 16.80 | 13.95 | 1.— |
| 3 | Marlborough, | 17.83 | 13.23 | 1.— |
| 3 | Milford, | 18.00 | 13.77 | 7.13 |
| 2 | Nantucket, | 17.95 | 10.75 | 3.30 |
| 3 | Natick, | 17.87 | 9.87 | 1.— |
| 3 | Newburyport, | 18.13 | 8.65 | 1.— |
| 4 | North Attleborough, | 18.65 | 11.72 | 1.— |
| 3 | Norwood, | 18.53 | 10.90 | 8.87 |
| 3 | Plymouth, | 17.93 | 10.23 | 1.— |
| 3 | Quincy, | 18.77 | 9.33 | 2.10 |
| 2 | Southbridge, | 23.50 | 9.05 | 1.— |
| 3 | Spencer, | 22.47 | 8.77 | 1.— |
| 2 | Stoneham, | 18.20 | 8.30 | 1.— |
| 3 | Wakefield, | 19.37 | 11.73 | 1.67 |
| 2 | Ware, | 18.60 | 9.85 | 3.40 |
| 2 | Webster, | 19.05 | 4.35 | 1.— |
| 3 | Westfield, | 18.23 | 7.07 | 1.— |
| 3 | Woburn, | 18.53 | 11.63 | 1.— |
| | Average, | 19.20 | 10.52 | 2.17 |

*Companies making Gas from Petroleum.*

| Number of Inspections made. | NAME OF PLACE OR COMPANY. | Candle-power. |
|---|---|---|
| 2 | Amherst, | 36.75 |
| 2 | Gardner, | 46.80 |
| 2 | Leominster, | 28.80 |
| 2 | Lexington, | 24.95 |
| 2 | Middleborough, | 27.25 |
| 2 | Stoughton, | 59.75 |
| 2 | Williamstown, | 52.05 |
| | Average, | 39.48 |

In comparison with recent years, the following table gives the averages of this year's work: —

| | 1900. | 1899. | 1898. | 1897. | 1896. |
|---|---|---|---|---|---|
| All companies but oil gas: — | | | | | |
| Average candle power, | 19.50 | 20.01 | 20.14 | 19.71 | 19.07 |
| Average sulphur, grains per 100 cubic feet. | 10.77 | 10.57 | 9.61 | 9.54 | 8.85 |
| Average ammonia, grains per 100 cubic feet. | 1.82 | 2.52 | 2.06 | 2.29 | 1.79 |
| Average candle-power: — | | | | | |
| Coal gas, 37 companies, | 18.18 | 18.23 | 18.43 | 17.92 | 17.61 |
| Water gas, 12 companies, | 22.85 | 23.88 | 23.72 | 23.66 | 22.77 |
| Mixed coal and water gas, 13 companies. | 20.14 | 20.02 | 20.21 | 19.79 | 19.39 |
| Petroleum oil gas, 7 companies, | 39.48 | 40.97 | 38.02 | 38.11 | 35.41 |

The companies supplying gas in Middleborough, Wakefield and Westfield are under municipal control.

At Gloucester, Marblehead, Stoneham and Williamstown part or all of the tests were made at the gas works, as being the most available places.

In the following tables are given the violations of the law, numbering this year 49.

*Deficient Candle-power.*

[Legal standard, 16 minimum.]

| Number of Inspections. | PLACE. | Date. | Amount. |
|---|---|---|---|
| 22 | Charlestown, | Nov. 15, | 15.6 |
| 2 | Danvers, | March 28, | 15.0 |
| 3 | Dedham, | June 5, | 15.4 |
| 24 | Fall River, | March 22, | 15.1 |
| 13 | Malden, | Dec. 21, | 14.7 |
| 2 | Stoneham, | Nov. 17, | 13.7 |

*Excess of Total Sulphur (Grains per 100 Cubic Feet).*

[Legal standard, 20 maximum.]

| Number of Inspections. | PLACE. | Date. | Amount. |
|---|---|---|---|
| 4 | Attleborough, | March 7, | 23.7 |
| 41 | Cambridge, | Jan. 4, | 22.6 |
| – | Cambridge, | Feb. 24, | 21.2 |
| – | Cambridge, | April 5, | 26.6 |
| – | Cambridge, | May 26, | 26.5 |
| – | Cambridge, | July 10, | 25.5 |
| 22 | Charlestown,* | Jan. 6, | 20.8 |
| – | Charlestown,* | Feb. 1, | 21.5 |
| – | Charlestown,† | April 10, | 21.8 |
| – | Charlestown,† | April 18, | 25.0 |
| – | Charlestown, | Nov. 15, | 34.1 |
| 6 | Gloucester, | April 24, | 23.8 |
| 15 | Jamaica Plain, | Sept. 13, | 20.6 |
| 20 | Lawrence, | May 23, | 20.9 |
| 52 | Lowell, | Jan. 20, | 21.8 |
| 3 | Milford, | May 10, | 20.6 |
| 17 | Newton,‡ | May 3, | 24.8 |
| – | Newton,‡ | May 25, | 24.8 |
| – | Newton, | July 10, | 23.1 |
| 10 | Salem, | Jan. 11, | 20.4 |
| – | Salem, | July 11, | 30.5 |

* Consecutive. † Consecutive. ‡ Consecutive.

*Excess of Ammonia (Grains per 100 Cubic Feet).*

[Legal standard, 10 maximum.]

| Number of Inspections. | PLACE. | Date. | Amount. |
|---|---|---|---|
| 10 | East Boston, | Dec. 26, | 13.5 |
| 3 | Greenfield,* | March 29, | 15.9 |
| – | Greenfield,* | Oct. 17, | 25.6 |
| 12 | Holyoke, | Jan. 25, | 77.0 |
| 3 | Milford, | May 10, | 14.4 |
| 3 | Norwood, | June 5, | 12.8 |
| – | Norwood, | Dec. 22, | 10.6 |
| 9 | Taunton, | Jan. 17, | 18.5 |

* Consecutive.

*Sulphuretted Hydrogen present.*

[Legal standard, none allowed.]

| Number of Inspections. | PLACE. | Date. |
|---|---|---|
| 3 | Adams, | March 30. |
| 3 | Amesbury,* | April 4. |
| – | Amesbury,* | Oct. 16. |
| 3 | Arlington,† | Sept. 28. |
| – | Arlington,† | Nov. 23. |
| 2 | Easthampton, | Nov. 8. |
| 24 | Fall River, | Nov. 16. |
| 13 | Malden, | Jan. 24. |
| 2 | Middleborough, | Nov. 14. |
| 3 | Natick, | Oct. 20. |
| 3 | Plymouth, | Dec. 20. |
| 3 | Spencer, | April 13. |
| – | Spencer, | Dec. 28. |
| 2 | Stoughton, | Nov. 6. |

* Consecutive. † Consecutive.

On December 27 the Amesbury gas was found to be free from sulphuretted hydrogen, the first time since Nov. 3, 1893.

While the excesses of total sulphur have increased from 17 in 1899 to 21 in 1900, still, the reduction of the sulphuretted hydrogen excesses, from 24 in 1899 to 14 in 1900, would indicate that more care is being used in purification. Sulphuretted hydrogen is an exceedingly poisonous gas, and there is no excuse for leaving any of it in the gas, except carelessness or broken or insufficient apparatus, as it is easily detected and as easily removed. On the other hand, the determination of the amount of total sulphur is a delicate chemical operation, requiring skill and apparatus not generally possessed by gas works managers. In the absence of means of knowing how much sulphur is left in the gas, it is difficult to know how to change the purification.

At the request of the Board of Gas and Electric Light Commissioners, a test was made of the gas furnished by the Massachusetts Pipe Line Gas Company to the Brookline Gas Light Company at its Allston station, and also that furnished the Jamaica Plain Gas Light Company. Immediately after the Allston test a test was made of the gas furnished its consumers by the Brookline Gas Light Company from its holders. These tests comprised the usual candle-power, sulphur and ammonia tests, the specific gravity, eudiometric analysis and heat units by calorimeter. The analyses are first and eighth in the table of analyses; the other results follow: —

| | Massachusetts Pipe Line Gas Company. | Brookline Gas Light Company. |
|---|---|---|
| Candle-power, | 21.1 | 21.4 |
| Sulphur, | 11.5 | 10.1 |
| Ammonia, | 1.— | 1.— |
| Specific gravity, | 0.437 | 0.532 |
| B T. U. gross, expt., | 677.2 | 688.2 |
| B. T. U. net, | 624.6 | 645.0 |

The Jamaica Plain Gas Light Company's works were visited, and the manufacturing plant found dismantled, only the exhauster, station meter and holder being in use. Here a sample, number 9, was taken of the Pipe Line gas as it entered the works; and immediately after a regular examination was made, at the office, of the gas as supplied to consumers, the candle-power being 19.1, the sulphur 14.3 and the analysis appearing as number 5 in the list.

The last 13 analyses were made at the request of the Board of Gas and Electric Light Commissioners.

*Eudiometric Analyses.*

| | Candle-power. | Specific Gravity. | Illuminants. | Marsh Gas. | Hydrogen. | Carbonic Oxide. | Nitrogen. | Oxygen. | Carbonic Acid. | B. T. U. Gross calculated. | Ratio Carbon and Hydrogen in Illuminants. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Brookline, | 21.4 | 0.532 | 9.52 | 29.14 | 34.83 | 19.01 | 4.51 | 0.10 | 2.89 | 688.2* | $C_{3.23}H_{6.42}$ |
| Danvers, | 15.0 | – | 4.54 | 33.96 | 52.27 | 6.72 | 1.19 | – | 1.32 | – | $C_{3.10}H_{5.80}$ |
| Fall River, | 15.1 | – | 8.40 | 21.46 | 36.42 | 28.51 | 2.86 | – | 2.35 | – | – |
| Haverhill, | 23.7 | – | 11.51 | 23.81 | 28.06 | 27.82 | 3.24 | – | 5.56 | – | $C_{3.12}H_{6.33}$ |
| Jamaica Plain, | 19.1 | – | 5.97 | 39.50 | 38.62 | 6.72 | 8.69 | 0.09 | 0.41 | 664.1 | $C_{2.50}H_{5.36}$ |
| Lynn, | 18.5 | – | 7.52 | 27.36 | 42.27 | 17.52 | 3.42 | 0.18 | 1.73 | – | $C_{2.48}H_{5.91}$ |
| Malden, | 14.7 | – | 10.74 | 29.25 | 39.71 | 17.55 | 0.40 | – | 2.35 | – | $C_{2.18}H_{4.95}$ |
| Massachusetts Pipe Line Gas Company, Allston, | 21.1 | 0.437 | 8.53 | 38.17 | 39.12 | 6.44 | 7.01 | – | 0.73 | 677.2* | $C_{2.39}H_{3.75}$ |
| Massachusetts Pipe Line Gas Company, Jamaica Plain, | – | – | 6.34 | 37.56 | 37.39 | 7.41 | 10.10 | – | 1.20 | 626.1 | $C_{2.33}H_{3.52}$ |
| Stoneham, | 13.7 | – | 5.76 | 38.68 | 44.62 | 5.97 | 2.79 | 0.68 | 1.50 | – | – |
| Wakefield, | 18.3 | – | 5.97 | 41.00 | 40.47 | 5.06 | 4.81 | 0.25 | 2.44 | – | – |
| Boston, | 23.7 | – | 15.17 | 21.59 | 33.31 | 25.33 | 2.22 | 0.13 | 2.25 | 705.3 | – |
| Boston, | 23.2 | – | 15.49 | 18.37 | 33.63 | 27.66 | 2.21 | – | 2.64 | 684.5 | – |
| Boston, | 24.2 | – | 11.45 | 25.18 | 35.97 | 22.96 | 3.58 | – | 0.86 | 670.7 | – |
| Boston, | 21.6 | – | 7.49 | 33.99 | 36.95 | 12.98 | 5.96 | – | 2.63 | 654.6 | – |
| Boston, | 23.1 | – | 8.93 | 32.96 | 36.03 | 15.34 | 5.28 | – | 1.46 | 676.7 | – |
| Boston, | 21.3 | – | 8.57 | 34.96 | 35.13 | 13.77 | 6.58 | – | 0.99 | 681.9 | – |
| Boston, | 20.8 | – | 9.04 | 34.42 | 34.94 | 14.55 | 6.04 | – | 1.01 | 687.4 | – |
| Brookline, | 19.3 | – | 6.38 | 37.70 | 37.22 | 8.90 | 8.04 | – | 1.76 | 662.2 | – |
| Brookline, | 22.6 | – | 14.79 | 12.89 | 32.36 | 34.65 | 2.49 | – | 2.81 | 645.9 | – |
| Brookline, | 21.0 | – | 6.53 | 39.09 | 36.90 | 9.13 | 6.96 | 0.17 | 1.22 | 679.2 | – |
| Brookline, | 20.0 | – | 5.78 | 35.79 | 39.09 | 10.52 | 7.94 | – | 0.88 | 642.4 | – |
| Brookline, | 19.8 | – | 5.35 | 41.29 | 37.63 | 7.74 | 7.18 | – | 0.81 | 676.2 | – |
| Brookline, | 20.8 | – | 7.72 | 40.78 | 34.46 | 6.90 | 10.03 | – | 0.11 | 704.8 | – |

* Experimentally determined by calorimeter.

## Gas Meters.

During the year 1900 there were 30,565 gas meters inspected; of this number, 29,928 were new, or had been repaired, and were presented for inspection before being used. There were 637 meters which, being in use, were suspected of registering inaccurately and were reinspected on complaint. The following table gives a comparison of the number of meters tested for the last five years: —

| | 1900. | 1899. | 1898. | 1897. | 1896. |
|---|---|---|---|---|---|
| First six months, . . | 14,431 | 12,683 | 9,541 | 9,172 | 10,594 |
| Second six months, . . | 15,497 | 17,277 | 13,023 | 13,512 | 11,081 |
| Complaints for year, . | 637 | 485 | 537 | 443 | 1,200 |
| Total for year, . . | 30,565 | 30,445 | 23,101 | 23,127 | 22,875 |

The law allows to be stamped as correct a meter that does not vary more than two per cent., either way, from the standard measure. In testing meters care is taken that the temperatures of the water, air and meter do not vary more than two degrees. When these conditions are fulfilled, the meter is connected with the standard meter prover, the connections tested for tightness, and air or gas passed through the meter at the rate of six feet per hour for each light the meter is marked to supply. Meters registering accurately within the two per cent. limit, under these conditions, are stamped as correct by soldering a brass badge, bearing a serial number, on one corner of the top and impressing the date in sealing wax on the opposite corner. The badge and date prevent the top being unsoldered and taken off, which is necessary in order to change the rate of registration, without destroying or mutilating these evidences of inspection. Gas companies are liable to a fine for supplying consumers with gas through a meter not duly sealed and stamped. Only a few new or repaired meters failed to pass this inspection, and these were returned for correction before being sealed. The 637 "complaint" meters were those which were reinspected on the complaint of consumer or gas company, in compliance with the provisions of section 12, chapter 61, Public Statutes. The results obtained follow: —

One meter would not pass gas, and therefore could not register; three would pass gas but would not register. The average error of the remaining 633 meters was 0.74 per cent. fast. Two hundred and fifty-eight meters, 40.5 per cent. of the total number reinspected, were fast, the average error being 4.81 per cent. A fast meter is one that *registers* more gas than it passes; that is, it registers in favor of the gas company and against the consumer. Seventy-seven meters, 12.09 per cent. of the total number reinspected, were slow, the average error being 10.75 per cent. A slow meter registers less gas than it passes; that is, it registers in favor of the consumer and against the gas company. Two hundred and ninety-eight meters, 46.78 per cent., were correct within the legal limits. Of the fast meters, 145 registered between 2 and 5 per cent. fast, 103 between 5 and 10 per cent., 6 between 10 and 15 per cent., 3 between 15 and 20 per cent. and one was just 20 per cent. fast. Of the slow meters, 32 were between 2 and 5 per cent. slow, 29 between 5 and 10 per cent., 7 between 10 and 15 per cent., 4 between 15 and 20 per cent. and 1 each 26, 30, 53, 105 and 174 per cent. slow. If a meter registers 1 foot of gas while passing 3 feet, the error of 2 feet, the gas passed without registering, must be 200 per cent. of the amount registered, 1 foot; the meter would then be 200 per cent. slow.

Meters should be set in easily accessible places and not more than six feet from the floor; this arrangement would allow the consumer to frequently read his meter, and, in case of an accident, such as a broken pipe or fixture, to quickly turn off the gas.

The amount of fees charged and received and the cost of running the office are given in the following statement: —

## Financial Statement.

Salaries, inspector and assistant inspectors of gas and gas meters: —

| | | |
|---|---|---|
| Appropriation, | | $4,387 50* |
| C. D. Jenkins, | $2,500 00 | |
| L. S. James, | 1,337 10* | |
| C. H. Stone, | 390 00* | |
| | $4,227 10 | |

* For part of year. See chapter 459, Acts of 1900.

Travelling expenses of same: —

| | | |
|---|---|---|
| Appropriation, | | $1,300 00 |
| C. D. Jenkins, | $510 91 | |
| L. S. James, | 179 48 | |
| C. H. Stone, | 62 97* | |
| | $753 36 | |

## *Gas Meter Fees Account for 1900.*

INCOME.

Number and size of meters tested, including complaints and fees: —

| Meters. | | | |
|---|---|---|---|
| 21, | 2 lights, | | |
| 17,738, | 3 lights, | at 25 cents, | $6,811 75 |
| 9,488, | 5 lights, | | |
| 2,257, | 10 lights, | | |
| 577, | 20 lights, | | |
| 222, | 30 lights, | at 30 cents, | 959 70 |
| 27, | 45 lights, | | |
| 88, | 50 lights, | | |
| 28, | 60 lights, | | |
| 1, | 70 lights, | | |
| 23, | 80 lights, | at 50 cents, | 39 00 |
| 54, | 100 lights, | | |
| 28, | 150 lights, at 90 cents, | | 25 20 |
| 10, | 200 lights, at $1.25, | | 12 50 |
| 1, | 250 lights, at $1.50, | | 1 50 |
| 2, | 300 lights, at $1.70, | | 3 40 |
| 30,565 | | | $7,853 05 |

| | |
|---|---|
| Due Jan. 1, 1900, | 2,156 90 |
| | $10,009 95 |
| Of this there has been collected, | 8,706 45 |
| Leaving due Dec. 31, 1900, | $1,303 50 |

In addition to above there has been collected: —

| | | |
|---|---|---|
| Due July 1, 1899, | $1 30 | |
| Postage stamp, | 02 | |
| | | $1 32 |
| Making total collections for 1900, | | $8,707 77 |

EXPENDITURES.

| | |
|---|---|
| Appropriations, deputies' salaries, etc., | $2,500 00 |
| Apparatus and supplies, | 250 00 |
| Office rent, apparatus, etc., chapter 499, Acts of 1900, | 700 00* |
| | $3,450 00 |

* For part of year.

| | | |
|---|---|---|
| Salaries, deputy meter inspectors: — | | |
| T. E. Spear, | $1,040 02 | |
| T. C. A. Brown, | 587 50 | |
| E. E. MacFarlane, | 185 00 | |
| E. A. Page, | 15 00 | |
| | | $1,827 52 |
| Office expenses: — | | |
| Rent, | $600 00 | |
| Stationery, | 8 99 | |
| Printing and record books, | 41 25 | |
| Postage, | 18 25 | |
| Telephone, | 60 00 | |
| Gas, | 9 60 | |
| Bench and meter fittings, | 114 10 | |
| Book cases, | 10 00 | |
| Miscellaneous, | 22 83 | |
| | | 885 02 |
| Meter inspection expenses: — | | |
| Badging meters, | $245 13 | |
| Travelling, | 132 07 | |
| Brass, | 54 04 | |
| Wax, | 25 00 | |
| Repairing seal, | 2 00 | |
| | | 458 24 |
| Apparatus and supplies: — | | |
| Case for portable photometer, | $75 75 | |
| Brass wet test meter, | 50 00 | |
| Barometer for second assistant, | 15 60 | |
| Thermometers for calorimeter, | 30 00 | |
| Candles, | 7 50 | |
| Repairs to test meters, | 18 05 | |
| Burners for sulphur apparatus, | 8 75 | |
| Repairing chronograph, | 4 00 | |
| Miscellaneous apparatus, | 44 61 | |
| Chemical supplies, | 21 87 | |
| | | 276 13 |
| | | $3,446 91 |

In addition to above, there was a deficiency of $384.88, as follows: —

| | | |
|---|---|---|
| Office expenses: — | | |
| Miscellaneous, | $13 48 | |
| Meter expenses: — | | |
| Badging meters, | 142 26 | |
| Brass for badges, | 29 12 | |
| Travelling, deputies, | 30 06 | |

| | | |
|---|---|---|
| Apparatus and supplies: — | | |
| Two chronographs and repairing, | $55 50 | |
| Sulphur test meter and repairing, | 36 00 | |
| Gas burners for testing, | 53 88 | |
| Case for second assistant, | 7 00 | |
| Sulphur apparatus for second assistant, | 9 18 | |
| Miscellaneous apparatus, | 5 60 | |
| Chemicals, | 2 80 | |
| | | $384 88 |

In the report for last year more money was asked for to run the office; this increase was granted by chapter 459, Acts of 1900, which became a law July 16, 1900. The full annual amount, $1,600, including apparatus and supplies, was therefore not available for 1900; but, as the intention of the Legislature appeared to sanction an expenditure at the rate asked for, no curtailment of the work of the office was made during the last quarter-year, although the appropriation was practically exhausted October 1, excepting an amount sufficient for office rent and deputy meter inspector's salaries. In order to make room for another desk for the two assistant inspectors, a few changes in the arrangement of the apparatus were necessary; this opportunity was taken advantage of to properly set up a wet test meter. The only chronograph owned by the State is nearly twenty years old and nearly worn out; the necessity of frequent repairs and consequent loss of time made it imperative to obtain a new chronograph for the first assistant as well as for the second assistant inspector. After some searching, the office was successful in obtaining two very reliable chronographs of a tested and approved pattern. The second assistant was fitted out with the necessary apparatus, in a portable form, for travelling. A series of certified argand burners, as used for official testing in England, was imported to be used for testing for candle-power, as the law provides that the burner to be used for determining candle-power shall be the one best adapted to the gas and at the same time suitable for domestic use. In order to carry out the provisions of the law and to get the second assistant at work, it was deemed necessary to make these expenditures.

Respectfully submitted,

CHARLES D. JENKINS.